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## GSA Annual Meeting in Indianapolis, Indiana, USA - 2018

Paper No. 225-5

Presentation Time: 9:10 AM

### GLACIAL EROSION, SEDIMENT TRANSPORT, AND ENVIRONMENTAL CHANGE IN THE GRINNELL AND SWIFTCURRENT VALLEYS, GLACIER NATIONAL PARK, MONTANA, USA (Invited Presentation)

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Temperate valley glaciers are key geomorphic agents in the evolution of alpine landscapes. Associated glacial processes, such as frost cracking, avalanching, and chemical weathering are likely responsible for most of the additional denudation and sediment transport in glacierized settings. Even during deglaciation, subglacial erosion is effective in producing subglacial sediment (e.g., Koppes, 2002), including headwall backwearing through oversteepening of valley walls above glaciers. Despite a strong understanding of the suite of processes responsible for alpine landscape evolution, constraining the spatial and temporal distribution of erosion in glacierized valleys continues to be a challenge. In an effort to better link glacier size, erosional processes, and records of environmental change, we examined sediment cores in a series of glacial lakes to constrain key geomorphic processes and provide insights into the spatial distribution of sediment delivery over time.

Glacier National Park, Montana is sensitive to climate change as observed through historical glacial retreat (e.g., Key et al., 2002) and ecosystem adjustments (e.g., Klasner and Fagre, 2002), and there is widespread interest in the effects of future climate change in this unique public space. Lake sediment cores from the Grinnell Glacier valley in the northeast region of the Park show the response of the glacier since the end of the Last Glacial Maximum (Schachtman and others, 2015). The mineralogy and elemental composition of the bedrock in the valley provides constraints for the sources of lake sediments over time, demonstrating shifts in the geomorphic sources of clastic sediment to the chain of lakes. Shifting organic carbon sources, climate change, fire response, and human impacts are also observed in the lake cores. This has implications for the use of lake sediment cores in our interpretations of the geomorphic response of alpine landscapes to environmental change.

Session No. 225

[T56. From Alpine Glaciers to Ice Sheets: Understanding Glacial Dynamics, Landscapes, and Environmental Change](#)

Wednesday, 7 November 2018: 8:00 AM-12:00 PM

Room 136-137 (Indiana Convention Center)

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